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Mr. Hoover is head of the department of geography at State Teachers College, Tempe, Arizona, and an associate in research at the Arizona Museum. He has been carrying on extensive studies of the American Indian especially in Arizona, and contributed an article entitled, "The Indian Country of Southern Arizona," to the *Geographical Review*, January, 1929. The study here presented is a most interesting and striking illustration of human adjustments to canyon environment.

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MODERN CANYON DWELLERS OF ARIZONA

J. W. HOOVER
State Teachers College, Tempe, Arizona

Northern Arizona is noted for the prehistoric ruins in the cliffs of its canyons, the most notable of which are in the canyons of Navajo and Tyende Creeks, and in the canyons De Chelly and Del Muerto. Perhaps less known but none the less notable are the modern canyon dwellers, the small group of Indians, remnant of the Havasupai tribe, who live in the Cataract or Havasu Canyon.

CATARACT CANYON AND ITS OASIS

This canyon is one of the most important branch canyons of the Colorado and has been formed by Cataract Creek which joins the Colorado River about 150 miles below the El Tovar Hotel at Grand Canyon. After meandering over the high plains for about fifty miles, the stream suddenly enters a "box canyon" bounded by steep walls of red sandstone which becomes higher and higher as the stream cuts deeper. About thirty miles from the head of the canyon, "the red walls widen out to form a secluded little valley which is a veritable oasis in a vast wilderness of rock."[1] Here on a flat area of about 500 acres of arable land is the home of the Havasupai Indians. A spot of rare scenic beauty, it is peculiarly inaccessible, and in it one feels in a world apart.

The Supai village is encompassed by sheer cliff walls of brightly colored sandstone and limestone, rising over a half mile above the valley floor.[2] The rock formations are essentially the same as those over the "Red Wall" of limestone in the Grand Canyon of the Colorado. Every view presents two towering cliffs. The lower cliff is of the characteristic red Supai formation which takes its

[1] The Doheny Scientific expedition to the Havasupai Canyon, Northern Arizona, Oct. and Nov. 1924, p. 3. Oakland Museum, Oakland, Calif.

[2] The elevation of the valley floor at the Supai Indian Agency is about 3,200 feet and the plateau above about 6,000 feet. See topographic maps of the Grand Canyon National Park. U.S.G.S.

name from this locality, and grades from slabby limestone at the base thru massive sandstone to shale. Backset above it is the yellow-gray wall of massive Coconino sandstone capped by several hundred feet of siliceous gray limestone known as the Kaibab formation. Between the lower red and upper gray cliff forming sandstones is some hundreds of feet thickness of yielding red shale, the more rapid erosion of which is responsible for the backset of the higher cliff on the wide red platform known as the Esplanade. The Coconino sandstone forms everywhere an almost unbroken wall, and getting down over it calls for a hazardous and thrilling stretch on each of the two trails leading into the canyon.

The Supai village claims the distinction of being the most inaccessible postal station in the United States, and mail is brought in only once a week. Telephone connection has been extended into the canyon for only three years.

After the thrills of the long and hazardous descent into the canyon, the sight of the verdant oasis with the clear waters of Cataract Creek wending across, and the sound of laughing children reverberating from canyon walls, is most pleasing. One feels as tho he has found Eden, and the rest of the world seems remote and long ago.

The course of Cataract Creek is marked with the lines of green willows which arch over it. Away from the stream, the flat land is divided into small fields cultivated by the Indians, and dotted with fruit trees and cottonwoods. The flat area of the oasis is the surface of a calcium carbonate or travertine deposit. Slightly warm waters emerging from the limestone have here precipitated the calcium carbonate which they had dissolved, thus building up the grade of the stream to the nearly level valley floor. Below the oasis, the travertine deposits descend in terraces over which the stream tumbles in a series of cascades and waterfalls.

Approaches to the Supai Oasis

The Supai oasis is reached by two trails. The shorter, the Haulpai trail, nine miles in length, enters the canyon by a west branch from a point 70 miles north of Seligman. This was formerly the chief approach. But now the more frequented Topocoba trail, twelve miles long, enters the canyon by Lee's Canyon, an east branch 35 miles from El Tovar Hotel. Prior to the author's visit

in the summer of 1927, no white man had gone over the former trail or over the faintly marked roadway leading to it, for over eight months; and at Rose's Well, the last and only habitation beyond Seligman, information was not available, as these people were unaware that there was a way from there to the canyon. All trace of a road had disappeared at this point and it was necessary to return to Seligman and find the one man who had been over it eight months before, and then try again. On the second attempt the roadway was found after several miles driving over limestone rock and boulders. Both trails, but especially the Havasu, have difficult and dangerous stretches skirting cliffs hundreds of feet high.[3]

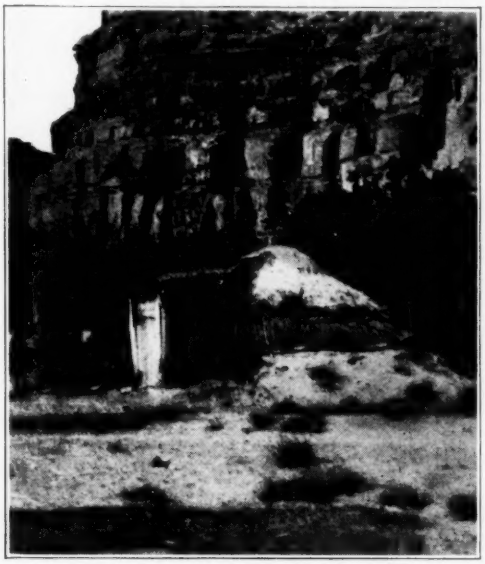

FIG. 1. Typical Supai hogan.

According to the superintendent of the Grand Canyon National Park, "the Supai trail is the longest and most difficult to descend in the Park." The Indians have developed splendid horsemanship in going over these trails, and this is shared by many of the women as well as the men. However, the trails have not been without their fatalities to both man and beast.

Several years ago a hitherto unbelievable feat was accomplished in taking down into the canyon a small piano weighing over 378 pounds when stripped. Before this nothing over 200 pounds had been taken down. The Park Service had advised that it would be hazardous to make the delivery. Four handles were placed on the piano and it was carried by hand for seven miles and by horses the rest of the way, excepting at narrow places, huge boulders, and sharp turns, where the horses had to be removed. The event was heralded across the continent by the newspapers, and a Pathé News man was on hand to record the event in motion pictures. The job required two professional piano movers, ten Indians, and seven horses.

[3] See *History of Arizona*, by T. W. Farish, Vol. 2 p. 102, Phoenix, Arizona, 1918.

THE SUPAI INDIANS

The Supai tribe now numbers only about 185; and usually there are less than 100 in the Canyon, the others being employed at Grand Canyon Park or in attendance at boarding schools. Some stay at Grand Canyon Park practically the year around, performing day labor and receiving from three to four dollars per day. The people are nearly all old or very young, and there is a notice-

FIG. 2. A part of the Supai oasis as seen from "The Fort." Paths wind between cultivated patches, fruit trees and cottonwoods. Enclosed by canyon walls.

able lack of young women in the tribe. Most of the children and young people were wiped out by the influenza epidemic of 1918, A few men have overcome the strong tradition for tribal purity and have brought in Apache and Hualpi squaws. Reports to the effect that these Indians formerly destroyed half breed babies seem to have been without foundation as careful investigation reveals no evidence of such practice. None of the present Indians recall any half breed babies being destroyed. They are very devoted to their babies and children.

According to legend of the Supais, they are a branch of the Apache Indians. Their renegade chief is supposed to have been

chased by the other Apaches and run down into the canyon. However, their neighbors, the Hualpais, claim them as kin; and it is true their languages are similar enough that anyone who can speak the one may understand the other. Their physical resemblance also suggests kinship, and if the Supais are Apaches at all, it is as so called "Mojave Apaches" of Yuman stock.[4]

Economic Adjustments in the Havasupai Indian Reservation

The Havasupai Indian Reservation was set aside in 1882. Only 518 acres are included within the canyon walls, the remainder of its 38,400 acres being above the canyon. Ninety-five thousand acres are also allowed to the Indians for pasturage, by the National Park Service. Only about 80 acres in the canyon are under cultivation at the present time. Over 200 acres may be irrigated, but the Indians are unable to get water on most of this. More extended irrigation is projected. A cement dam is planned to replace the dams built by the Indians and which have always been subject to wash-out after heavy rains. It will cost about $2,500 with the Indians contributing the labor.[5]

Patches of corn, watermelons, cantaloupes, squash, alfalfa, beans, onions, and chili, are interspersed with fruit trees. Thru or between the fields, sandy trails extend in every direction. Some of the better irrigated fields are divided into small sections in checkerboard pattern, in order that the water may be better distributed. Supai peaches are abundant in season and of superior quality. Lesser quantities of other fruits as figs, apricots, apples and cherries add to the attractiveness of the oasis.

The climate is favorable, as the massive walls absorb and hold the heat of the sun, and keep the temperatures an average of ten to fifteen degrees higher than on the plateau above. However, the heat may be oppressive because of the humidity. The winters are cold but not severe. Snow seldom falls and when it does it quickly disappears.

A few of the Indians leave Supai for the fall and winter but

[4] For ethnology of the Supai Indians, see L. Spier's Havasupai Ethnology, Anthropological papers, American Museum of Natural History, 29: 81-392, 1928.

[5] Earl Y. Henderson, The Havasupai Indian Reservation (Pamphlet) pp. 12-13, 1928. Office of Indian Affairs, Dept. of the Interior.

mostly to hunt. They state, however, that their main object in leaving the canyon is because wood is more plentiful at places on the rim. All but 5 or 6 families now remain at Supai during the fall and winter as they have learned that it is warmer and cheaper to live at home in the canyon.

DESTRUCTIVE FLOODS

Occasionally disaster in the form of floods enters this little Eden. The rainfall of this semi-arid region is characteristically irregular, occasionally coming in sudden downpours, which flood the canyons bounded by their narrow walls. The most destructive of these in recent years occurred in 1910 when a ten-foot wall of water rushed down the canyon and swept away the agency buildings, the school, the Indian huts, and devastated fields and irrigation ditches. The superintendent and his wife saved their lives by cutting thru the roof of their home and climbing into a large cottonwood tree. The agency was then moved to a safe place farther down the canyon.[6] In August of 1928 another flood resulted in considerable destruction and one fatality. The flood came without warning, for altho it had been raining a good deal on the rim of the canyon, there had been no rain at Supai. The flood, characteristic of the sudden rush of waters down canyons and washes in northern Arizona, came into Cataract Canyon via Lee's Canyon. In parts of the Supai oasis the water rose as high as 12 to 15 feet. It uprooted many trees, destroyed the irrigation ditch, field crops and fruits, and carried away poultry, and horses, and Indian personal property. The fatality was the old wife of head chief Manakja. After four hours search her body was found entangled in barbed wire near a tree.[7]

SUPAI HOUSING

The beauty of the valley has only one jarring note: the row of unoccupied ugly frame houses built by the Indian Service for the Indians over 10 years ago. The Indians have refused to occupy them as too hot in summer and too cold in winter. If they are used at all, it is only for storage of grain or alfalfa. So they still ad-

[6] Jean K. Stacy, "Cataract Canyon, the Home of the Supai," in *The Native American*, 26. 63-69, Mar. 21, 1925. Phoenix, Ariz.

James McClintock, Arizona *The Youngest State*, Vol. I, p. 39. 3 vols., Chicago, 1916.

[7] Patrick Hambly, Supt. of the Supai Reservation, has kindly given and checked information concerning the Supais and Supai Reservation.

here to their primitive type of dwelling, which resembles the Navajo hogan. It is usually built over supporting posts which come to a peak. Other small poles are leaned between these and over all a thatch is applied. Earth is then piled around the bottom and in the winter time nearly to the top. A doorway is set upright on the side toward the rising sun. A sapling lodge for summer use is usually found nearby. In the walls of the canyon are some cliff dwellings which were formerly used in the winter time, or

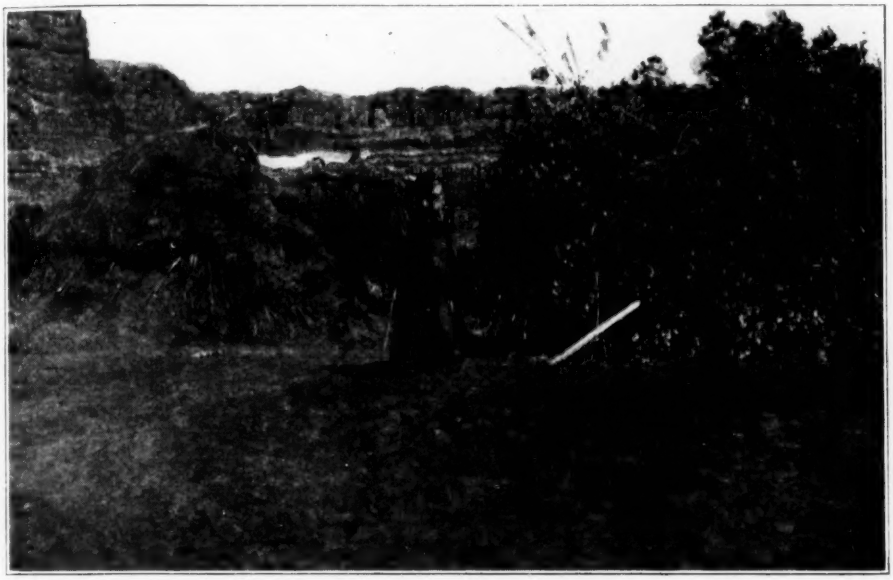

FIG. 3. Mrs. Captain Borough at home. Typical hogan to the left and summer shelter to the right.

in seeking safety from Apache or Navajo raids. Before the frame houses built by the government came to be used for storage, the Indians stored their supplies in the recesses or caves high up in the rock of the canyon wall. The high caches secured the food supply from flood and marauders. Each family had its own storage compartment which was sealed up with rocks and mud and marked for ready indentification.[8]

Numerous and unusual pictographs on the canyon walls are indicative of very ancient occupation of the canyon. It is very probable that the ancestors of the present day Supais also occupied and cultivated small patches of land in subordinate gorges of the

[8] Earl Y. Henderson, Idem, pp. 7-8.

Colorado Canyon below Bright Angel and at Indian Gardens below which there are remains of an aboriginal aqueduct.

TRAVERTINE TERRACES AND CATARACTS

Cataract Canyon is so called because of its three water-falls which are exceptional in origin and singular in beauty. Instead of the usual *recessional* type, cutting back in horizonal layers of rock, here we have falls *advancing* by building out platforms from which to plunge. A few miles above the falls a strong stream emerges from limestone with waters slightly warm and heavily charged with calcium carbonate and lesser quantities of calcium sulphate with magnesium chloride and sulphate, which it has dissolved in passing thru the rock. Much of the lime is precipitated as travertine along the stream below and thus the grade of the stream has been gradually built up for several miles. But the reduced gradient is compensated in the next few miles in which the stream cascades over travertine terraces of its own depositing.

FIG. 4. Havasu or Bridal Veil Falls, 125 feet in height, and travertine deposits.

The falls in order are the Navajo Falls, some 60 feet in height; the Havasu or Bridal Veil Falls, 125 feet; and the Supai or Mooney Falls, 196 feet. All flow over walls of travertine appearing like frozen cascades of rock, or suggesting waterfalls that had suddenly turned to stone. The character of the

terraces at each of the falls, with the numerous hanging stalactites, shows that all have shifted position from time to time as the travertine ledge was built out under the stream. In each case the terrace extends all the way across the canyon. That at the Supai Fall is not only highest but is the most effective barrier. It is now possible to go down over it by a series of tunnels and dizzy ladders, but before this

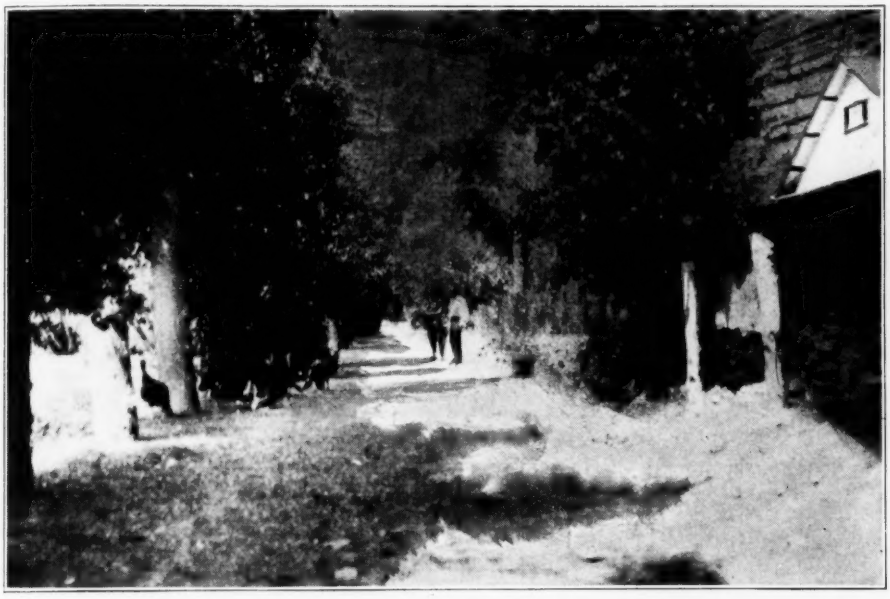

FIG. 5. Pathway leading to school building. Superintendent's cottage to the right. Note canyon walls behind the cottage and beyond the school building.

construction, crossing it was almost impossible. Some years ago, a man named Mooney fell to his death in attempting to go over the cliff with a party. For 18 months his body lay there, until a part of the present passage was constructed, but was found in an almost perfect state of preservation due to the coating of lime precipitated from the mists of the falls.[9] Other objects in the water are similarly encased by the mineral precipitates. Rocks are formed around the roots of trees and other plants. If growth is rapid enough to overcome this formation they live; if not, the plants die. In close proximity to this present formation of fossils thru incrustation, fossils of Carboniferous age may be found imbedded in the limestone walls.

[9] Stacy: p. 67-68.

Between the major travertine terraces and above them are numerous smaller ones over which the water cascades several feet at a time. Behind each is a pool of clear or chalky pale blue water. On the east side of the Supai oasis a stream formerly entered the canyon, after flowing thru the limestone, and built up a great pile of travertine. Over it were formed a series of terraces similar to those of Mammoth Hot Springs in Yellowstone Park. The low travertine walls fronting the beds of the pools, long since dry, were heightened by crude masonry of the Supai Indians and the travertine pile became a fort which afforded protection from Apache and Navajo raids.

Captain Borough, now over 100 years of age loves to relate how the fort was built long long ago as a defense gainst the Tonto Apaches who would make raids and capture the Supai women. He also tells how General Crook loaned the Supais two muzzle loaders and taught Captain Borough how to use them. When the Apaches came again he shot and killed two of them. The others ran and none ever returned.

The beauty of the falls and terraces cannot be overlooked. The canyon has been the setting and inspiration for Cadman's, "From the Land of the Sky-Blue Waters." It has also been the haunt of artists, archaelogists and scientists. Thanks to its difficulty of access, it has not as yet been dispoiled by tourists.

Fed by the spray of falling waters, vegetation grows luxuriantly around the bases of the falls. Water moss and maiden hair ferns cover the rocks. Brown stalactites are spotted with vari-colored lichens. The vegetation varies from tropical luxuriance to desert harshness, depending on the degree of exposure to moisture or sun. The travertine readily breaks down into fertile soil and is in part responsible for the luxuriant vegetation about the falls and for the fertility of the valley floor above.

In the last few years a few tourists have begun to enter the Havasu Canyon in their quest for new and unusual sights; and with their coming the old hospitality mixed with begging is giving way to the general commercial spirit. But the Supai will continue an artful beggar for some time to come. Soon the peaceful isolation of this spot will be a thing of the past and perhaps the last remnant of the Havasupai tribe will also pass away with it.

SILK PRODUCTION IN LATIN AMERICA

CHARLES E. LANDON
Duke University

The United States is the world's chief consumer of silk goods. We import upward of half a billion dollars of raw silk annually to satisfy our demands, nearly all of it coming from Japan. That country will probably be our chief source of raw silk for many years yet, but several of the countries of Latin America are making an attempt to establish a silk-growing industry which some day might offer considerable competition to the Japanese growers of cocoons. Brazil is the leader in this new enterprise, followed by Panama, Honduras, Nicaragua, and Cuba.

Influences Encouraging Silk Production

Various influences have acted as an encouragement to the industry in those countries. Foremost in Brazil is probably the desire for some crop to offset the disadvantages of a one-crop agriculture in the coffee districts, where, for the past ten years, the growers have been experiencing the difficulties of one of those long cycles of overproduction that are typical of orchard industries. This is also true of Cuba to some extent, where there have been several years of overproduction and low prices for sugar. Another influence is the desire of those in control of the agricultural policies of the different countries to establish new industries in order to develop more fully the resources and possibilities of their respective countries.

Favorable and Unfavorable Factors for Silk Growing

Climate

Several factors would appear to make these countries desirable places for the establishment of silk growing.

First is the favorable climatic conditions both for the growing of silk worms and the growing of mulberry trees, the leaves of which constitute the food for the worms. Brazil and Nicaragua seem to have excellent climatic conditions. In the latter country it is claimed that mulberry trees attain as much development in five months as they do in Europe in five years. In Brazil a native

mulberry tree grows with ease and rapidity. This same tree can also be used as a fence or hedge, and its leaves are said to be excellent cattle feed. Thus more than one use can be made of it. The climate of Brazil also permits of five or six hatchings of eggs per year.

FIG. 1. Grafted mulberry trees, five months old, in Nicaragua. In Europe a mulberry requires five years to attain equal growth. Courtesy Pan American Union.

Transportation Second is the nearness of those countries to the United States, which is, as was stated above, the chief market for raw silk. This nearness to the United States would give those countries an advantage in ocean transportation costs over Japan in case the industry could be developed to the point that it could place the raw silk at a seaport as cheaply as the Japanese can place it at their ports. The successful establishment of the industry in these countries would also increase their prosperity and make additional markets near home for surplus products of the United States.

Another consideration is that of inland transportation. Most Latin American countries have poor inland transportation facilities, and thus must produce crops which have a relatively high value in small bulk in order that they can be profitably sent from the interior to the seaports. The poor facilities make transportation

costs prohibitive on many products. Most of these countries grow some coffee because it has a moderately high value in small bulk. Silk would seem to make a more desirable crop in this respect than would coffee. These countries are making efforts to improve their means of transportation, however, and are making considerable progress. Consequently one can look for high transportation costs to be of gradually declining importance. In Brazil, however, inland transportation is sufficient in the potential silk producing areas. Since Brazil is the leader in the industry and would probably be the largest producer under any circumstances, the question of inland transportation is not important insofar as its relation to a large volume of production is concerned.

Capital Another factor is capital. These countries are lacking in a domestic supply of capital, and it is often difficult for them to attract it from foreign sources. Fortunately, the production of silk worms and cocoons, as it is ordinarily done, requires but a small outlay of capital. If one entered the industry on a large scale, large outlays would be needed for mulberry orchards, worms, equipment, and labor; but the industry is usually worked on a small scale, cottage basis. Not a large number of trees is required, and the work is usually done by the family. Here, then, is a money crop which these people can grow and export with probably as small or a smaller outlay of capital than would be required by nearly any other crop. In addition, the governments of the different countries, in order to encourage the industry, generally provide mulberry trees, eggs, and information free of charge, as well as giving many other privileges.

Labor There is, however, one factor which is not very favorable in these countries. That factor is labor. Silk growing requires an abundant supply of cheap labor, skilled in the methods of the industry. This accounts for the importance of Japan in silk production. Latin America does not have as dense a supply of labor as does Japan, nor is it as ambitious and energetic. The skill is also lacking, but it could be developed in time if the natives showed the desire to learn. In Nicaragua this has been the case. The people there take up the industry readily and learn the details with a fair degree of ease. There are large numbers of people in these countries who would have the time required by the industry if they cared to employ it in that manner. At present, the countries are agricultural, and the families live largely a self-sufficient exist-

ence. They could easily put in a part of their time, with the proper incentive, at producing a small supply of a money crop such as silk. The work is also of such a nature that it does not require the time of an entire family. Old men, women, and children can readily do everything there is to be done.

One method by which this labor problem may be met in part is thru immigration. Large numbers of Spaniards and Italians and many Japanese are settling in these countries. Many of these immigrants may have had experience in silk growing in their native lands. These people cannot so much make up the labor shortage that exists, but those who are skilled can act as teachers for those who wish to learn the methods of the industry. The effects of this could probably not be of wide importance, but it would be an aid in helping develop the skill that is now almost entirely lacking. It is said that the Italians who have gone to Brazil are especially interested in the industry.

FIG. 2. Mulberry trees three months after planting, Nicaragua. Courtesy Pan American Union.

COUNTRIES DEVELOPING SILK CULTURE

Brazil Of the countries which are experimenting with the industry, Brazil is doing most, and it is claimed that there are great possibilities. The State of São Paulo, which is also the great coffee state, is the center of the industry, with the State of Rio de Janeiro following. The National Silk Society, a private company organized in 1924, is largely responsible for the expansion of the industry. This company has its headquarters in São Paulo, but is back of the industry in all of the states where it has been

established. In São Paulo the state gives an annual subsidy for five years, beginning in 1925, of about $125,000 to this company if it fulfills certain requirements. There is also a duty on imported silk goods, a part of which is distributed to silk mills spinning threads of five or more strands from cocoons. The company must furnish mulberry seedlings, eggs, and technical and agricultural information free of charge to the growers. It also agrees to purchase all cocoons from the growers at the highest market price. At present it is de-

FIG. 3. An exhibit of cocoons from various parts of Nicaragua. Courtesy Pan American Union.

veloping a breed of silk worms especially suitable for conditions in Brazil. During the season of 1926-27 it distributed over 1,000,000 mulberry trees, and purchased 135,000 kilograms of cocoons.

The State of Rio de Janeiro has also offered much encouragement to the establishment of the industry. The government has exempted mulberry orchards, the raising of silk worms, and the manufacture and exportation of silk thread from state taxes. Premiums are also given for planting mulberry trees and the suc-

cessful raising of cocoons. Mulberry trees are given free for setting out orchards, and classes in silk culture have been started in the state agricultural schools.

With the six hatchings of eggs which are possible in Brazil, a new source of income is possible for the farmer within a period of a month and a half in case other crops fail. A source of income at regular intervals thruout the year is possible also. This is not the case with many crops. The returns are also good, one grower being able to make about $150 per hatching. Six hatchings, then, would give a sizeable annual income.

In Brazil, the growing of silk worms was at first a cottage industry, but it has spread to the large coffee plantations. It is reported that five hundred plantations are now producing silk worms and that as many more are planting mulberry trees in preparation for the industry. If the plantations can make a success of this, it will certainly be an advantage. It will mean an added crop to depend upon, with a more uniformly distributed income, than is the case with coffee, and it will make possible a more complete and efficient utilization of the plantation labor supply.

Panama Of the remaining countries, Panama seems to be taking most interest in the industry. Companies have been formed and consessions granted to them by the government. One company has agreed to plant 10,000 mulberry trees, provide 1,000,000 silk worm eggs, and instruct twenty-five persons in the methods of the industry. In return, the government pays $7,500 for trees and $4,000 annually to the company as organizer and director of the experiment. Another company plans to grow the raw silk, weave it, and sell the finished goods to neighboring countries. It has factories and offices in Colon, and has contracted for a large area of land near Mount Hope, in the Canal Zone, on which it expects to plant 100,000 mulberry trees. An expert is instructing fifty boys in the Minors School of Correction at Panama City. Mulberry leaves are obtained for this work from the agricultural experiment station nearby, where 10,000 mulberry trees are planted. Dr. V. K. Osigian, an Armenian silk expert of United States citizenship, has been employed by the Panamans to direct the industry in its infancy. He comes from a family which has been engaged in silk production for about 700 years, and was engaged in the same kind of work in Nicaragua before he went to Panama.

Other Countries Honduras, Nicaragua, and Cuba each have made a start. The government of Honduras has granted a concession of approximately 4,500 acres, in return for which the concessionaire must import mulberry trees and silk worms and teach operators in the methods of the industry.

In Nicaragua, the industry is operated on a cottage basis. The natives have taken considerable interest, and learn the methods in a short period of time. The returns thus far have also been good.

Cuba has done but little as yet. An Italian expert has been obtained to direct the work. The southern slopes of the mountains in the Province of Pinar del Rio have been selected as the best location.

SUMMARY

Brazil has the greatest possibility of any of these countries of producing large amounts of raw silk. Its climate in the eastern highlands is good. It can obtain the capital that is needed, and has sufficient transportation already developed. Its labor is more accustomed to regular work than is the case in some of the other countries, and there is a fair supply of it in the coffee regions. Also, the agriculture of Brazil is more specialized than in any of the other regions, except possibly Cuba. The people know the dangers of a one-crop system, and thus there is greater incentive for them to diversify their industries.

WHAT SHOULD A GEOGRAPHY TEXTBOOK CONTAIN?

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To what extent the opinions of teachers and administrators concerning the needs of children in their study of geography may be considered a reliable index as to desirable characteristics of a geography textbook is a debatable question. Such opinions, however, throw some light on the thinking of these two groups regarding their problems in guiding the efforts of children in their study of this subject. To the degree that they do this, they are worthy of thoughtful consideration.

This article summarizes the judgments of over six hundred individuals in four western states.

SOURCE OF THE DATA

The Committee on Research in Geography, appointed by the Elementary Section of the Western Division of the Montana Education Association in 1927, in a desire to stimulate thought and discussion on the subject of the teaching of geography in the elementary school, sent to teachers in various sections of Montana a questionnaire of several pages, concerning teaching procedures, available supplementary geographical readers and other equipment, and characteristics of a geography textbook. At a later date, the Montana State Committee on Research in Geography, appointed in 1928 by the Montana Society for the Study of Education, sent a modified form of this questionnaire to administrators in various sections of Idaho, Washington, and Oregon. Responses were

* Acknowledgment is due to the following persons for their assistance in this investigation:

Mrs. Alice R. Grant, Principal, Bozeman, Montana, and chairman of the committee on research in geography for the Elementary Section of the Western Division of the Montana Education Association, for her assistance in the construction and interpretation of the questionnaire, and for the use of the data secured by her committee.

Miss Aurelia Boles, County Superintendent of Schools, Missoula, Montana, and chairman of the Elementary Section of the Western Division of the Montana Education Association in 1928, for the distribution of the questionnaire.

Superintendent D. S. Williams, Bozeman, Montana, member of the executive committee of the Montana Society for the Study of Education, and to Superintendent C. G. Manning, Lewistown, Montana, President of the Montana Society for the Study of Education, for their splendid co-operation and assistance in furthering the work of the Montana State Committee on Research in Geography.

received from 527 teachers of Montana rural graded schools and 92 administrators of the other three states.

That part of the questionnaire devoted to the textbook was confined to those characteristics which definitely concern study helps for children—assignments, devices for motivation, and such guidance in the reading of the material in the textbook as tends to aid children in building up economical and effective habits of reading geographical materials. Other features of a textbook, such as the mechanics of the book, however important they may be, were not considered to be directly appropriate for this list.

On other pages of the questionnaire was given an occasional statement or question relating to the textbook. As far as possible, the responses to them have been included in the interpretation of the data.

SUMMARY OF THE RESPONSES

In the following table, the first columns show the percentage of teachers, or administrators, who checked each item as one which a

PERCENTAGE			RANK				
527 Teachers.	64 Admin. Graded S.	28 Co. Supt.	527 Teachers.	64 Admin. Graded S.	28 Co. Supt.	Number of the Item.	
I	II	III	IV	V	VI		
95	94	89	1	2	1	1	Content sufficiently easy for the children to read with some enjoyment.
94	95	71	2	1	7	12	Content which helps children to see the *how* and *why* of facts—why the people of each region live, work, and play as they do.
92	88	79	3	5	4	20	Many tests, well-distributed, and of the so-called "new-type examination."
90	88	82	4	5	2	15	Maps of the best quality.
88	91	79	5	3	4	3	Content which suggests problems and encourages children to find problems and to ask intelligent questions.
85	80	68	7	10	9	2	Silent reading devices of a variety of types for assignments to guide children in their study.
85	86	75	7	6	5	5	A large variety of pictures of real geographical quality.
84	78	50	8	11	17	16	Simpler map studies, showing children how to use maps, and giving them abundant practice in the kind of map study which helps them to understand the relationships between man's activities and his environment.

PERCENTAGE			RANK				
527 Teachers.	64 Admin. Grade S.	28 Co. Supt.	527 Teachers.	64 Admin Grade S.	28 Co. Supt.	Number of the Item.	
I	II	III	IV	V	VI		
83	73	68	9	13	9	8	Content which gives the children practice in turning back to material already read, either for verification or enrichment of a point under discussion or to aid them in a clearer understanding of the lesson.
81	84	64	10	7	12	13	Content which introduces children to outstanding regions in a continent, rather than require them to distribute their time over isolated facts of each country in that continent.
77	81	71		9	7	17	Content which provides in the assignments abundant practice in the kind of map study which helps them to understand the relationships between man's activities and his environment.
75	56	39	12	20	20	7	Geographical games and puzzles, at least for the lower grades.
74	73	68	13	13	9	9	A large amount of rich detail on important topics of interest to children on which they need more detail to satisfy their curiosities and to aid them in developing important concepts.
71	66	61	14	16	14	11	Many grafical or pictorial representations to aid children in the interpretation and memory of certain difficult concepts.
69	81	64	15	9	12	14	Suggestive supplementary reading lists of interesting geographical materials for the children to read to extend their knowledge on the topic being studied.
67	73	61	16	13	14	4	Many references to pictures in the reading material.
63	66	54	18	16	16	19	Suggestions for other appropriate activities—construction, sand table projects, dramatization, games.
63	66	46	18	16	18	18	Content which shows children how to construct useful types of grafs and charts to illustrate material read or interpret data.
60	61	43	19	19	19	10	Content which presents much of its material in story form.
49	64	57	20	18	15	6	Pictures without legends or captions so as to encourage the interpretation of them rather than the mere memorization of the legends or captions.

textbook in geography for elementary school children should contain. Column I shows the percentage of the 527 Montana teachers; column II, the percentage of the 64 administrators of graded schools in Idaho, Washington, and Oregon; column III, the percentage of the 28 county superintendents of those three states.

The next three columns indicate the rank of each item on the basis of the frequency with which the item was checked by the members of each of these three groups. Column IV gives the rank of each item as indicated by the number of teachers who checked it; column V, the rank according to the number of administrators of graded schools who checked it; column VI, the rank according to the number of county superintendents who checked it. Those items checked the largest number of times are indicated by the rank of one to ten in columns IV to VI.

In the column immediately to the left of the items is the number of each statement as it appeared in the questionnaire.

INTERPRETATION OF THE DATA

1. The rural and grade teachers and the administrators of graded schools consider that a geography textbook for use by elementary school children should possess most of the characteristics listed in the questionnaire. All but four items were checked by two-thirds or more of the teachers; all but three items were checked by two-thirds or more of the administrators in graded schools. There was close agreement between teachers of rural schools and those of grade schools. Only one-half of the items were checked by as many as two-thirds of the county superintendents.

2. There is rather close agreement among these three groups as to which items are relatively the most important. With two exceptions, all items ranking high with the teachers tend to rank high with the administrators. The exceptions are item 8, ranking thirteenth with superintendents and principals of graded schools, and item 16, ranking low with the county superintendents. Those items which rank particularly high in all three groups are numbers 1, 12, 20, 15, 3, 2, and 5.

3. It is particularly in grades three or four to six where the need for these characteristics in the geography textbook is greatest. (These data are not included here for lack of space.)

4. The almost unanimous vote on items 1 and 12 suggests that

a. The selection and grading of geographical materials in the hands of the children is of utmost importance.

b. A textbook for children should be more than a compilation of facts, however important those facts may be. It should lead children, in their independent reading of it, to understand relationships of man's activities to his geographical environment.

5. Item 2, concerning silent reading guides for study, was checked by 89 per cent of the grade teachers and 84 per cent of the rural teachers. Teachers realize that the emphasis in the teaching of content subjects is being shifted more and more from the testing of children with books closed, after study, to the guidance of children's efforts during study and to the self-checking with books open. This latter plan gives each child practice in desirable habits of study and provides both him and the teacher with an excellent type of test of his ability to read and think independently.

6. The vote on such items as 1, 12, 3, 2, 8, 13, 17, and 14 suggests that there has not been sufficient attention given to the reading problems in children's learning of geography.

a. These reading problems are not concerned chiefly with vocabulary difficulties. The character of the content, its presentation, the assistance which it gives to the study and utilization of pictures and maps, the stimulus which it offers to curiosity and desire to search for more information, and the possibilities of gaining from the independent reading an understanding or the relationships between what people do and their geographical environment—all of these are important factors in children's successful reading of geographical materials. The usual geography textbook does not sufficiently take these factors into account.

b. Extensive, exploratory reading on large units of thought is essential.

c. Reading materials should give practice in the application of the geographical principles learned.

d. Silent reading devices for assignments and frequent checks for measurement of progress assist children in developing economical and effective habits of studying geographical materials.

e. The reading of geographical materials should lead children to engage in a variety of interesting activities.

7. In-so-far as these 527 teachers and 92 administrators are representative of the entire body of elementary school teachers and administrators, we may conclude:

a. Those who are responsible for children's learning in geography believe that there is a real need for a different type of assistance than that which is furnished by the usual textbook.

b. Teachers are conscious of demands made upon them in the teaching of geography, particularly in the matter of providing stimulating assignments and checks, which they cannot meet single-handed, unaided by the textbook or some other source.

c. The way children learn is as important as what they learn. Provision for the guidance of children's efforts in the study of geography is at present inadequate.

d. These problems of teachers and administrators present a real challenge to teacher-training institutions, along two lines of investigation:

(1) To what extent are these demands of teachers and administrators reasonable, and how may they best be met?

(2) What should be the content of professional courses whose objective is to adequately prepare their students to teach geography effectively in the elementary school?

GEOGRAPHY IN POETRY

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INTRODUCTORY

A geography textbook is, at best, but a gaunt skeleton whose only purpose is to give form and dimensions to the geography course. Gone are the hornbooks and catechisms from American education, and, like them, memoriter drill from fact-crowded texts is rapidly vanishing.

Today, American schools are equipped as never before with well written, stimulating and psychologically organized textbooks in geography. To some teachers this has been an overpowering temptation to rely almost completely upon the textbook in geography teaching.

In spite of this tendency to rely solely upon the textbook by some, there is a healthy counter movement at work. There is, indeed, among an increasingly large number of wide-awake teachers, the tendency to view the textbook, no matter how admirable it may be, as merely a guide for the student just as the course of study is a guide for the teacher. The really progressive teacher utilizes wall maps, atlases, readers, travelogues, tourist guides, industrial prospectuses; in short, anything and everything which may yield the type of material which she deems necessary to give body, life, and expression to the potential geography course whose skeleton the textbook provides. In this way "Teaching from a stagnant pool is avoided and teaching from a running stream becomes a reality."[1]

POETRY AS A SOURCE FOR GEOGRAPHY

In response to the teacher's search for virile and suggestive supplementary material a whole host of geographical readers and travel books have appeared. Every good school system is now provided with such books. Not content with these, the more energetic teachers have ranged far afield into general prose literature for additional material.

While finding prose literature thus fruitful, it is surprising that geography teachers have not investigated the literature of poetry more thoroly. This is doubtless because, until recently,

[1] Statement from May Anderson, geography teacher, Vancouver, Canada.

poetry has been considered to be purely an emotional thing like singing and dancing. Indeed, there are still to be found those who protest that to attribute practical educational values to poetry is near-sacrilege and that to "interpret" poetry is to do violence to a pure emotion. But most modern scholars realize that poetry has a number of practical values which may be turned to account in education. Not the least of these is a geographic value-portraying human life in its environmental setting and revealing the relation between man and the natural environment.[2] Often bits of poetry possess a high descriptive value, and may even provide complete travelogues in which peoples, cities, and landscapic pictures pass in enticing review.

Indeed, an examination of American poetical literature reveals that the entire continent of North America has been described both as to the regional aspects of the environment and as to human life which is adjusted to the environment in all its varying phases. This is necessarily so, for the writer of poetry is, thru the possession of those very traits which make him a poet, enabled to perceive, at all times unbeknownst to himself, the delicate relations between man's life and nature amidst which he is environed. In the following pages selections from various poetical works have been made so as to portray in part the geography of certain regions of North America.[3]

The West Indies

Hundreds of islands, large and small, dot the blue of the Caribbean Sea—the American Mediterranean. From the smallest, which are mere volcanoes standing knee-deep in the sea, on up to the largest, these islands present an infinite variety of sights, sounds, and fragrances. Yet there is a certain monotony in their endless variety. From them man carries away with him a vivid remembrance of the blue sea and brilliant sky, of coconut-bordered shores battered by trade winds; of hot sun and drenching showers; of lowlands covered with endless sugar cane, back of which stand forest

[2] Dr. H. H. Martin, professor of geography at the University of Cincinnati has for many years been saving apt fragments of poetry for use in teaching the geography of North America and Europe.

[3] Selections from the author's larger work, "The Regional Georgraphy of North America as Revealed in American poetry." Master's thesis at Teachers College, Columbia University.

covered hills whose brilliant green is broken by straw-thatched native huts and clearings planted with coffee, cacao, or plantains.

MARTINIQUE[4]

Great cone-shaped mountains rising from a stream
All jungle-tangled; little bamboo walls
Of native huts beside clear waterfalls—
An island like a mad and lovely dream.
Mandarin trees, hibiscus blooms that gleam
And burn. Small towns, toy travesties of France,
With jabbering markets, the inquiring glance
Of turbaned women on whose wrists there scream
Bright parroquets. Smells of the tropic night—
Crushed cinnamon and smoke and breadfruit trees.
Great unknown shadows and the quiet light
Of the cathedral. Did you dream of these,
O Josephine, when some great sail in flight
Trailed on the wind the spice of Carib Seas?

THE MIDDLE WEST

From the cotton lands of the South, northward to the Great Lakes, and from the Appalachians westward to the semi-arid plains, stretches the Middle West. Wooded uplands and low rolling plateaus alternate with great flat open valleys, lake dotted plains and almost treeless prairies. Abundant rains during the hot, sunny summers and moderate snowfalls in the cold, continental winters provide favorable conditions under which diverse forms of agriculture and animal husbandry can be carried on. As a result, the region has, under the hands of industrious settlers, become one of the truly great food producing areas of the world. Over the country has been built a gigantic network of railroads and roads busily carrying the products of farm and dairy to the towns and little cities which occur at intervals thruout the region, or to the great distant cities where food and raw materials are collected and sent to far-off parts of the world.

IOWA[5]

Flat as a pancake, fertile as can be,
All the way from Keokuk to Calliope;
Corn that kisses cloudlets when its tassels wave,
Land that laughs a harvest when the reapers slave.

[4] Cornelia Otis Skinner, "Martinique," in *Scribner's Magazine*, Dec., 1924. Reprinted by courtesy Charles Scribners Sons.

[5] From "Iowa," by Maurice Morris, in the New York *Tribune*, 1922. Reprinted by courtesy of the Editor.

OMAHA[6]

Red barns and red heifers spot the green
grass circles around Omaha—the farmers
haul tanks of cream and wagon loads of cheese.

Shale hogbacks across the river at Council
Bluffs—and shanties hang by an eyelash to
the hill slants back around Omaha.

A span of steel ties up the kin of Iowa and
Nebraska across the yellow, big-hoofed Missouri
River.

Omaha, the roughneck, feeds armies,
Eats and swears from a dirty face.
Omaha works to get the world a breakfast.

KANSAS[7]

Oh, I have walked in Kansas
Through many a harvest field
And piled the sheaves of glory there
And down the wide rows reeled:

Straight overhead the orb of noon
Beat down with brimstone breath:
The desert wind from south and west
Was blistering flame and death.

And we felt free in Kansas
From any sort of fear,
For thirty thousand tramps like us
There harvest every year.

She stretches arms for them to come,
And roars for helpers then
And so it is in Kansas
That tramps, one month, are men.

We feasted high in Kansas
And had much milk and meat.
The tables groaned to give us power
Wherewith to save the wheat.

Our beds were sweet alfalfa hay
Within the barn-loft wide;

[6] Carl Sandburg, "Smoke and Steel," copyright 1920, by Harcourt, Brace and Co., Inc., N.Y. Reprinted by courtesy of Harcourt, Brace and Co.

[7] Vachel Lindsay, "Collected Poems," N.Y. 1923, pages 151-152. Reprinted by courtesy, The Macmillan Co.

The loft doors open out upon
The endless wheat-field tide.

The wind would drive the glittering clouds
The cottonwoods would croon,
And past the sheaves and through the leaves
Come whispers of the moon.

THE GREAT NORTHERN FORESTS

The great northern forest region extends from Labrador and Newfoundland for three thousand miles northwestward to the Yukon Basin of central Alaska. North of the Great Lakes, this forest is a dense stand of pine, hemlock, spruce, and other coniferous species, broken by great rivers and myriads of lakes occupying ice-scoured basins and morainal depressions. Toward the north the forest thins out and the trees are small and of slow growth, fit only to shelter bird life and fur-bearing animals. Tho the lumber and pulp industry and a little pioneer agriculture now assails the forest on its southern margins, the short, cool summers and the intensely cold winters have rendered most of the region of use only to the trapper and hunter.

WINTER IN THE NORTHERN FORESTS[8]

Then a shuddery breath like the coming of Death crept down from the peaks far away;
The water was still; the twilight was chill; the sky was a tatter of gray.
Swiftly came the Big Cold, and opal and gold the lights of the witches arose
The frost-tyrant clinched, and the valley was cinched by the stark and cadaverous snows.
The trees were like lace where the star-beams could chase, each leaf with a jewel agleam.
The soft white hush lapped the Northland and wrapped us round in a crystalline dream;—

THE FATE OF THE FUR FOLK[9]

Early, while the east is pale,
The trapper is out on the frozen trail;
Cruel traps are on his back,
Snares to line the woodland track;
Day by day he links the chain
Of these grim machines of pain,

[8] R. W. Service, from "The Ballad of Pious Pete" in Ballads of a Cheechako, N.Y., 1909, pp. 20-25. Reprinted by courtesy of Barse and Company.

[9] First stanza of "Fate of the Fur Folk" by Edwin Markham, *Ladies Home Journal.* To appear in Edward Markham's "Collected Poems," 1930. Reprinted by courtesy of Curtis Publishing Company and the author.

In whose merciless iron jaws
Little fur folk die, because
Men must high on Fortune ride,
Women have an hour of pride.

Maritime Canada

The Maritime Provinces of Canada constitute an extremely rugged region—a region of low, worn-down mountains clad in pine forests—a region of poor soils and harsh climate. Man's living has usually been won from the forest or the nearby ocean whose cool waters abound in fish. In a few fertile spots, however, such as the Cornwallis-Annapolis Valley, hard-working and prosperous agricultural communities have developed. The Acadian French were among the earliest and best known elements which took root in maritime Canada.

GRAND PRÉ, NOVA SCOTIA[10]

In the Acadian land, on the shores of the Basin of Minas,
Distant, secluded, still, the little village of Grand Pré
Lay in the fruitful valley. Vast meadows stretched to the eastward,
Giving the village its name and pasture to flocks without number.
Dikes, that the hands of the farmers had raised with labor incessant
Shut out the turbulent tides; but at stated seasons the flood-gates
Opened, and welcomed the sea to wander at will o'er the meadows.
West and south there were fields of flax, and orchards and cornfields
Spreading afar and unfenced o'er the plain; and away to the northward
Blomidon rose, and the forests old, and aloft on the mountains
Sea fogs pitched their tents and mists from the mighty Atlantic
Looked on the happy valley, but ne'er from their station descended.
There in the midst of its farms, reposed the Acadian village,
Strongly built were the houses with frames of oak and of hemlock,
Such as the peasants of Normandy built in the reign of the Henrys.

A TALE OF ACADIE[11]

Still stands the forest primeval; but under the shade of its branches
Dwells another race, with other customs and language.
Only along the shore of the mournful and misty Atlantic
Linger a few Acadian peasants, whose fathers from exile
Wandered back to their native land to die in its bosom.
In the fisherman's cot the wheel and the loom are still busy;
Maidens still wear their Norman caps and kirtles of homespun,

[10] Henry W. Longfellow, "Grand Pré, N. S.," in Poems of Places, Edited by Henry W. Longfellow, Boston, 1897, Vol. 30, pages 30-1. Reprinted by courtesy of Houghton, Mifflin Co.

[11] Henry W. Longfellow, from "Evangeline, A Tale of Acadie." Reprinted by courtesy of Houghton, Mifflin Co.

And by the evening fire repeat Evangeline's story,
While from its rocky caverns the deep-voiced, neighboring ocean
Speaks, and in accents disconsolate answers the wail of the forest.

Conclusion

The foregoing examples are but fragments which partially illustrate four geographic regions chosen at random. It is hoped, however, that they will be sufficient to show the enterprising teacher of geography that a very fertile field of source material lies in the literature of poetry. Such recognition may in addition prove of great value to the teacher of literature, for poetry, instead of being taught by "schools" or by "epochs" or by "authors," can be arranged so as to bring about a better understanding of the home region and of other regions with which it has relations. Not only can poetry be arranged so that it will describe and explain any given region, but it will also show what has been the literary production of the environmental conditions within the region, and this is perhaps after all the keystone of the understanding of poetry.

THE BALANCE BETWEEN FACT AND JUDGMENT WORK IN GEOGRAPHY

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The Meaning of Fact and Judgment Work

Discussion of educational problems is often rendered ineffective because there is not complete agreement on the exact meaning of the terms used. In order to remove this possibility in the present instance, permit me to explain briefly what I mean by Fact Work and Judgment Work in Geography. Fact Work is work aimed primarily at the acquisition of geographic facts. It is sometimes called Memory Work, since the only test of its success is whether or not the facts are remembered. The facts of geography are of course innumerable, and of widely variable relative importance. They may be classified as facts relating to places, to peoples, to physical features, to products, and to world relations. That the possible facts of geography are innumerable is readily seen from a consideration of these classifications. The location of every town and city, every lake and river, every cape and bay,

every mountain and plateau in the world is a potential geographic fact. The number, occupation, and characteristics of every national and racial group of people are geographic facts. So thru the other classifications we could enumerate thousands upon thousands of different geographic facts. To know one of these items is to know a geographic fact. To know all the possible facts of world geography would be to have a perfect knowledge of geography from the fact viewpoint. Fact work in geography is any exercise whose primary objective is to acquire a knowledge of one or more of these geographic facts. I would here make a distinction between Fact Work and Memory Work. While it is true that the acid test of our knowledge of a fact is that we remember it, it is also true that to attain this knowledge of a fact does not necessarily mean that we must focus our conscious effort solely on our effort to memorize the fact. In other words we can memorize unconsciously or indirectly. Thus when we constantly read about and purchase Hawaiian pineapple, we indirectly and without any conscious effort acquire a memory recall knowledge that Hawaii produces pineapples. This distinction has an important bearing on geographic method, as I shall point out later.

Next we may ask, what is meant by Judgment Work in Geography? Judgment is that act of the mind by which we draw conclusions from established premises, either deductively or inductively. It may involve either a determination of the result when the contributing factors are known, or a discovery of the cause for conditions observed. For example we may study the economic conditions in Uruguay—vast cattle holdings, valuable agricultural land, lack of iron ore and coal, and answer the problem: Is Uruguay likely to become an industrial nation? From the positive evidence of its predominant resources and the negative evidence of its lack of minerals, we infer that it is never likely to engage in general manufacturing. This is judgment applied to a problematic result.

Again, we may start with the observed fact that all the great cities of Brazil are in its southeastern corner, and set up the problem: Why is this so? In answering this question we learn that climatic, soil, and mineral conditions all favor this region, so that it produces practically all of the coffee, most of the corn, swine, cattle, and minerals and does all of the manufacturing of Brazil. In other words we discover causes by using our judgment.

OBJECTIVES OF THE NEW GEOGRAPHY

The reason for setting up the query as to the balance between fact and judgment work in geography arises from the changed conception of geographic method. The old style geography, in vogue generally until 1900 or thereabout, was essentially a factual study. Its predominant aim was to learn facts about the earth, its products, inhabitants, and activities. Since the aim was primarily a fact knowledge, the common method was the assignment of definite material to be memorized. The test of achievement in geography was the accurate remembrance and repetition of facts.

Gradually the so-called new geography evolved, and may be said to be still evolving. Its changed methods simply reflect its broadened objectives. One of the best statements of these aims of geography teaching as now conceived is found in a new book on Tests and Measurements, by Smith & Wright of Indiana University, published by Silver Burdett. In treating of geography testing, on page 268 they quote a summary of opinions from many sources as to the objectives of teaching the subject. Briefly these objectives are:

1. An understanding of the effect of man's physical environment upon his life.
2. Correct habits of thinking in the solution of social problems.
3. An understanding of man's relation to man socially and economically.
4. A working knowledge of the information necessary in ordinary life concerning place, surface features, political divisions, natural phenomena, and of how to interpret such information in maps, charts, etc.
5. An understanding of the influences of geographical conditions on political events.
6. A sympathetic understanding of the conditions and peoples of other countries.

Now it can readily be seen that No. 4 in this list concerns purely fact knowledge, which was formerly the sole aim in geography teaching. But the other five objectives are all concerned more or less with the judgment of cause and effect and of the inter-relation of geographic factors. It is from the consideration of these judgment-forming objectives of the study that the problem and problem-project methods of teaching geography have become prevalent. And just as in the past the factual content and the memory method were almost exclusively emphasized, so now in some quarters the problem method and the judgment forming objective have become the "ne plus ultra" of geography teaching.

It must be evident from a consideration of the six aims quoted that neither the fact nor the judgment method can be justified as

the sole and exclusive geographic procedure. There must be something of both types of work if geography is to accomplish all of its aims. The only questions are: 1) the balance that should be kept between fact and judgment work; and 2) the best method of ensuring this balance.

WHAT ARE THE ESSENTIAL FACTS?

The first question narrows itself down to a determination of what are the essential geographic facts which a reasonably well trained elementary school graduate should know. Opinions of course differ widely as to the content of such a list of minimum essentials in geographic facts. Time does not permit me even to summarize what I think such a list should contain. The best I can do is to lay down certain principles on which the list should be based. First of all it should not be so long a list as to become encyclopedic. Second, the list should contain all facts necessary to the cultural understanding of current events and historical allusions. Third, it should contain all facts necessary to an understanding of the economic, social, and political conditions in the principal countries of the world. Fourth, it should contain the facts on which the solution of the more important problems of world geography depend. As an example of such a list of facts I refer to Dodge & Kirchwey's Teaching of Geography in Elementary Schools, page 10-12, quoted from an article in the *Journal of Geography* for April, 1905, pages 149-155. The facts spoken of by Professor Whitbeck in this quotation are entirely locational, and there is need of a more comprehensive list including facts of size, population, climate, production, and government. The point I would impress is that there is a body of geographic facts which must be known by a pupil adequately trained.

How can a knowledge of these facts be ensured under the problem or problem-project method of teaching geography? First of all the problems must be chosen and organized so that the essential facts will be necessary in the solution of the problems. Second, at the conclusion of the study of each unit of instruction, tests must be given to determine whether or not the facts are known. Third, if after such tests it appears that certain facts are not known, then quick remedial instruction must be given to develop the fact knowledge which is lacking.

ARE WE TEACHING FACTS?

It is said by prejudiced and uninformed critics that the problem method as used today does not produce satisfactory fact knowledge. The best answer to such criticism is an actual test of pupils who have been trained by problem methods. Such a test was given recently in my own school. A set of 20 examination questions used in geography 75 years ago was given to 24 eighth grade children, who had done all their work with two up-to-date teachers who are problem and project enthusiasts, but who also appreciate the necessity of fact knowledge. Ten of the questions were the following:

1. Name the large island northeast of Nova Scotia.
2. What is the capital of Vermont? Where is it? On What?
3. What is the largest fresh water lake in the world?
4. What strait separates North America from Asia?
5. Largest river in South America?
6. What is the largest division of Europe?
7. What sea is located east of Italy?
8. What mountains separate Asia from Europe?
9. Of what country is Vienna the capital? Where is Amsterdam?
10. Into what does the river Volga flow?

We had a record of the results attained by 24 pupils on these 20 questions 75 years ago. I am not at liberty to give you complete figures on this experiment, as the whole story is to appear later in the report of Superintendent Burke of the Boston Public Schools, but I can state that our pupils made only 64 per cent as many errors as the old-time group. Stated in another way, our pupils were 36 per cent superior in fact knowledge to those whose instruction was purely on a memory basis.

Such a result ought to be heartening to present day geography teachers. We know that the problem method has enabled our pupils to think geographically. Problem solving is developing their judgment and their ability to reason from cause to effect and vice versa. We also know that in the process of solving problems they have acquired facts, and acquired them more efficiently than ever before. This is because a worth-while problem must be based upon facts which are also worth-while. The problem really means the finding out or applying geographic principles, a point which is explained very clearly in Dr. D. C. Ridgley's little book on "Geographic Principles." His explanation of the principle of the importance of straits is summed up by this paragraph:

"This study of straits in the light of a single geographic principle requires definite attention to place geography; brings together and relates a large number of facts of value as general information; provides ample opportunity for use of the problem method; illustrates concretely the use of a geographic topic as a type study; calls for a definite use of the textbook as a reference book; provides ample opportunity for use of reference books and supplementary readers. The proper use of geographic principles in teaching geography calls for the wise use of all available resources and the proper application of various methods of presentation." Not only that, but in the solution of problems and the working out of projects, our pupils acquire at least a working knowledge of more facts than were ever previously dealt with by children of similar grades. Also, our pupils acquire the research habit that opens to them great storehouses of facts of which their ancestors were almost totally ignorant. The modern child in contemplating the geographic knowledge of his predecessors might say with Hamlet: "There are more things in heaven and earth, Horatio, than are dreamt of in thy philosophy."

KEEPING THE BALANCE

The new geography teacher does not minimize the value of facts, nor consider them merely incidental. He recognizes both facts and problem solutions as necessary objectives in geography teaching. But neither does he wish to over-emphasize facts and he knows that his problems and projects produce fact knowledge. The important thing in preserving the balance between fact and judgment work in geography is to see to it that the minimum essential facts are carefully determined, to test results so as to ensure a knowledge of these facts, and to have faith in the problem method as a certain means of both acquiring facts and developing judgment.

HOW FAR IS IT———?

SAM T. BRATTON

University of Missouri

So begin many questions in Geography classes. Such questions, as a rule, are answered by stating the distance in miles, or in some other commonly used unit of measure. These units are useful mainly in determining sizes of areas, but they are of little value in the distance concept unless used in connection with time.

Geographical distance is not merely a concept of feet, or miles. The correct concept is obtained only by combining space units with time units. That one place is twenty-five miles from another place is of little value to people in their every day affairs unless the time factor is included.

Ten years or so ago, or at least before good roads and rapid transportation, twenty-five miles meant twenty-five-fifteen-minute-miles, and the concept was not complete without the fifteen minute part. Now days twenty-five miles means, in most cases, twenty-five-three-minute-miles, and this distance is not as far as twenty-five-fifteen-minute-miles. One means exactly that—it is not as far.

No longer is the earth the same 25,000 miles in circumference it was twenty-five years ago, nor is the distance across the United States the same as it was twenty-five years ago. The sooner teachers realize, and teach, these facts the sooner will they regain some of the confidence of their pupils. Do not make the mistake of thinking that pupils will not check up on your teaching. They will. They have the radio, telegraph, fast trains, Lindbergh, the Graf Zeppelin, and Commander Byrd.

New units of measure have entered into the daily lives of most people, and these new units are just as much a part of every day experiences as the old units were a generation ago.

What are we to do about it? Shall we no longer teach distance in miles? What shall we teach? One hopes that teachers everywhere are asking such questions. The answer? Teach the truth as it now is. Teach that places are time-distance units apart because they are *space-time* distances apart, and because such *space-time* distances are geographical distances.

EDITORIAL NOTES AND NEWS

The United States is now the largest producer and consumer of rayon altho the industry was first developed in Europe. The manufacture of rayon began in the United States in 1911 but rapid development began after 1921 and the greatest growth has taken place since 1925. Between 1921 and 1925 production increased from about 15 million pounds to 52 millions and to approximately 96 millions at the close of 1928. It is estimated that during the present year there will be an increase of 25 to 30 million pounds. There are now 19 large rayon manufacturing establishments employing 26,300 wage earners. In addition to our own vast production we have been importing from 12 to 16 million pounds yearly. During the first half of the present year 25 per cent of our imports came from Germany, and 23 per cent from Italy. Other important sources are France and Netherlands. This indicates that there is still a very large home market for future growth of the rayon industry. Thus far we export a very small part of our total production.

Are your classes following the Chinese-Russian situation in Manchuria? If so, perhaps the following data will be of assistance to you. Manchuria has an area of about 380,000 square miles. This is about the same size as France and Germany combined, or slightly smaller than the combined area of Ohio, Indiana, Illinois, Wisconsin, Minnesota and Iowa. Thirty years ago Manchuria had a population of about 2 million which has grown to about twenty-seven and one half million at the present time. During recent years the annual immigration into Manchuria has ranged from 800,000 to 1,000,000. Most of these immigrants have come from other parts of China. It is estimated that Manchuria has approximately sixty-four and one half million acres of arable land and only one-half of it is now cultivated. It possesses vast potential resources in agriculture, forests, and minerals. The principal crops are soya beans, wheat, millet, kaoliang, and Indian corn. Sugar beet culture and the live stock industry are developing also. Manufacturing industries include flour mills, bean oil mills, soap making, sugar refining, saw mills, distilleries, breweries, glass factories, and tanneries. It is also one of the principal coal producing regions of China. About four-fifths of the world's production of soya beans comes from Manchuria. The center of production is in what is commonly called Sungari Plains. This area is located in the bend made by the Sungari and Nonni rivers and is crossed by the Chinese Eastern Railway. Huge quantities of these beans are collected at the railway station of Anda which is about fifty miles west of Harbin. At times there may be 100,000 tons piled up in the open air at this station. In 1926, 20 per cent of the total exports of China were derived from the bean crop, and most of this was provided by Manchuria. Manchuria now contributes approximately 30 per cent of the total trade of China.

An airway map of the United States may now be obtained from the Aeronautic Branch of the U. S. Department of Commerce. As the name indicates this shows the airways now in operation in the United States. At the present writing accurate data are not available showing the number of miles flown, nor the total passengers, and freight and express carried in the United States. Among foreign countries Germany leads all in air transportation. Last year German aircraft flew 7,030,000 miles; carried 115,000 passengers; 1,130,000 pounds of mail; 4,282,000 pounds of baggage and freight. The next nearest competitor is France with less than half the mileage. It is interesting to note that six tons of mail were carried between England and India in the first three months that the air line operated between London and Karachi.

Tungsten which is used in making various alloys has become one of the most important industrial minerals. Approximately 63 per cent is supplied by China, about 18 per cent by Burma, and 14 per cent by Siam, the Malay States and Dutch East Indies. It is estimated that its use in the incandescent light has brought about a saving of approximately $200,000,000.

Last August a new airway line was opened connecting Los Angeles, Guatemala City, and Mexico City. There are three flights each way per week between Mexico City and Los Angeles, and two flights each way between Guatemala City and Mexico City. The Mexican Government is building a central airport in Mexico City at a cost of $200,000. This will have 125,000 square meters of paved runways, together with all necessary equipment such as a large hangar and repair shops.

Santos is now the leading port of Brazil. Last year both its exports and imports exceeded in value those of any other Brazilian port, including Rio de Janeiro. It has long been known as the great coffee exporting port. Huge storage warehouses can house more than five million bags of coffee at one time. Each bag contains 132 pounds. Santos is a transit city and hence is a point for transshipment of goods from and to more important centers of trade. It is the port of Sao Paulo, which is the principal industrial and agricultural state of Brazil, and is connected with the city of Sao Paulo by a good automobile highway and by a railroad which runs 10 or more passenger trains each way daily. Out of its total exports of $250,700,000 in 1928, $162,800,000 went to the United States, and the same country supplied $54,300,000 of its imports. The United States leads all other countries in the trade with Santos and buys about $150,000,000 worth of coffee yearly.

Volume I of the Commerce Yearbook, 1929, is now available for distribution, and may be obtained from the Superintendent of Documents, Washington, D.C., for $1.00. The volume contains a vast amount of material of value to every teacher of geography. Volume II will deal with foreign countries, and will be ready for distribution in October.

Write to the Pan American Union, Washington, D.C., for a list of their recent publications. If you are teaching South America you can scarcely get along without these valuable publications. They may be had for a very small charge.

The American automobile now rules the world in automotive transportation. The United States has aproximately 85 per cent of all the automobiles and trucks in use in the world. It is also supplying them to nearly all countries. The total value of our exports during the first half of the present year amounted to the huge sum of $354,800,000. Our export trade now takes about 10 per cent of the total production. Canada, Argentina, Australia, and Brazil were the leading buyers of passenger cars, and Argentina, Australia, and Brazil were the leading buyers of trucks, busses, and chassis. Germany, Canada, and Sweden led in the purchase of motorcycles. This world distribution of American automobiles has been a great stimulant to the construction of highways. Thousands of miles of highways are now under construction or completed in countries where good roads have never been known until recent years.

INTEREST-STIMULATING DEVICES

An Electrical Map

In Memorial Junior High one of my five sections in seventh grade geography has taken as its project the making of an electrical map, which is used by all classes in turn. I have been very much surprised at the "frantic" interest they have had in this map. Children who could hardly be made to study a map have begged to stay after school so they could "play" with this map. Children from other classes come in between classes and with great interest work at it.

The map is one of North America drawn on a piece of wallboard about four feet square. At the center of the top is inserted a porcelain socket and a five-watt red light bulb. One wire leads from the light fixture to this bulb, and then on from the blub to a pointer—made by running the wire thru a piece of bamboo with the end of the wire protruding. The protruding end of the wire has the insulation pushed back so that a quarter of an inch of the bare wire is exposed. The other wire leads from the light fixture to a second pointer. (For purposes of this explanation I will call these pointers "A" and "B.")

The names of the cities are marked at one side of the map being arranged in alphabetical order. At the side of each name is a bolt which goes thru the map and the nut is screwed on to the back. The names of the important cities of the country are marked in their places on the map by other bolts, and a wire leads from the city bolt back to the bolt at the side of the map. This wire is not visible on the front, of course.

Two pupils play the game at one time. One pupil holds pointer "A" and the other pointer "B." Some one (the teacher or another pupil) call off the name of the city to be found. The pupil with pointer "A" finds the name on the side of the alphabetical list (and incidentally they are given needed training in this) while the one with "B" pointer hunts up the city. The names of the states are put in, but of course those of the cities are marked only by the bolt. When both press their pointers on the right names, the red light at the top of the map flashes on. They never seem to tire of this.

The cost of the map has been about $2 so far, and as we plan to add a few more cities will come to a bit more. Most of the material can be bought at the ten-cent store. Wallboard comes from the lumberman, but sockets, bulb, wire, and even the pliers and small brace and bit to bore the holes can be bought at the stores for from ten to twenty-five cents.

Orlando, Florida LEADA NEWMAN BERST

Making an Encyclopedia

The seventh grade derived much enjoyment and benefit from constructing an "encyclopedia of facts" on the countries studied. Each pupil was responsible for his page, including the arrangement of appropriate pictures. The data was arranged in this manner, each letter forming the beginning of a sentence.

E
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G
L
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D

The value of this device was in the amount of outside material read by the class.

Junior High School BESSIE I. ENDERS
Coeur d'Alene, Idaho

Send your devices to the Editor. We will be pleased to publish more plans that have been found to be helpful.

GEOGRAPHICAL PUBLICATIONS

George McCutcheon McBride. **The Land Systems of Mexico.** 216 pp. Illustrated. American Geographical Society, New York. 1923.

The old dog is learning new tricks—speaking not of Professor McBride, who might well object, but of the science of geography, which likes to be called old. However, it may not be the same old dog but a new one, a puppy. Undoubtedly geography is old, but a new science of geography seems to be on foot, performing in new ways, yet not set in its ways nor well developed.

One of the earmarks of this new thing is such a book as McBride's "Land Systems of Mexico." Perhaps the author would object to this imputation too, and would even deny that his work is geography. Certainly it is not geography in the too common sense of a mere formal description, with enumeration and dissection of physical features. Rather than being a geography of Mexico the volume is a well defined topical study interpreting one phase of human occupancy of the land from a geographic viewpoint. This point of view is particularly fitting with respect to Mexico, where, if anywhere, the land system "has either grown up out of the very depths of its physical environment or has, at least, been modified by adaptation to the habitat into which it has been transplanted."

Land ownership is a part of the intricate and variegated pattern of land occupancy which spreads over the earth and fits into the intricate and varied natural setting of diverse regions. It is in the interpretation of this phenomenon, generally neglected in geography, that the book exemplifies one phase of a new geographic trend. Moreover, the fact that it is somewhat historical does not make it less geographical. The land pattern of the present cannot be interpreted entirely from present circumstances, its "roots lie buried in the past." That geography should accept the responsibility for such an interpretation seems desirable for the development of the science and for the enlargement of human knowledge of the earth.

Not only does the book achieve its purpose of interpreting land control, but incidentally it gives a clear general view of Mexican geography. Its general value is strengthened rather than weakened by the fact that the chapter on "geographical setting" is a purposeful depiction rather than a stereotyped irrelevant description of features, and that thru the book regional characteristics are concretely illustrated in terms of land control. In this respect it is unsurpassed among recent geographical writings on Mexico.

The study is not the last word on the subject—it is the first word, an introduction to Mexican land occupancy. It deals only with one phase of land occupancy, and for that phase it is only a general survey based largely on census reports and other documents which by their very nature leave various questions unanswered. For example, the census classification of all modern pueblos as similar land units is admittedly incorrect, and yet subdivision of the group is only hinted at and analysis is not undertaken. The way is open for many detailed field studies. Mexico is no exception to the world wide fact that full geographic generalization awaits the completion of many intensive field studies. May this introduction to the field lead many to follow where Professor McBride has shown the way and where the American Geographical Society has had the vision to foster the enterprise and publish the results.

ROBERT S. PLATT

University of Chicago

ANNUAL MEETING OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS

Columbus, Ohio, December 27-28, 1929

The next annual meeting of the Council promises to be one of the best in the history of the organization. Papers will be presented on a variety of topics so every teacher of geography from the earliest grades to graduate work in college will find something of direct interest in the program. The recommendations of the Board of Directors as to endorsement of the courses in high school geography will be presented for discussion in one of the general sessions.

The principal emphasis of the program will be placed on the introductory course in college geography. Carefully prepared studies will be presented by Professor Finch of Wisconsin for the Liberal Arts College, by Professor Orchard of Columbia University for the College of Business Administration, and by Professor Schockel of Indiana for the Teachers College. The discussions will be participated in by a number of the foremost geographers of America. These papers and discussions are expected to set new milestones in the progress of geographic science.

The complete program will be published in the November issue of the *Journal*. Watch for it and plan to attend the meetings. Every effort will be made to provide sessions that will yield enduring professional results and at the same time prove inspiring to all who are present. The generous co-operation already extended assures success.

NELS A. BENGSTON, *President*

University of Nebraska
September 15, 1929

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J171	—Eastern United States	40
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